

REMARKS

The Office Action mailed May 24, 2007, has been received and the Examiner's comments carefully reviewed. Claims 1-19 remain pending, and have not been amended. These claims have been reproduced above as a courtesy to the Examiner. No new matter has been added, and favorable reconsideration of this application is requested in view of the following remarks.

Claim Rejections - 35 USC § 103

In the Office Action, claims 1, 3, 14 and 16-19 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Choy et al. (U.S. Patent No. 5,487,120) in view of Sekiguchi et al. (U.S. Patent No. 6,814,546). Claim 2 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Choy et al. in view of Sekiguchi et al., and further in view of Ramaswami et al. (U.S. Patent No. 6,571,030). Claims 4-6 and 15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Choy et al. in view of Sekiguchi et al., and further in view of Webb (U.S. Patent No. 5,475,778) and Jiang et al. (U.S. Patent Pub. No. 2002/0024698). Claims 7-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Choy et al. in view of Webb and Jiang et al. Applicant respectfully traverses these rejections.

A. Claims 1, 3, 14, and 16-19

Independent claim 1 recites that “each WDM includ[es] a plurality of separate electrical to electrical converters, each mated with one of the optical to electrical converters at a card edge connector, each electrical to electrical converter including input and output signal locations.” Claim 14 recites that “each WDM includ[es] a plurality of separate main signal to electrical converter cards received by each chassis, each main signal to electrical converter card mated with one of the optical to electrical converter cards at a card edge connector, each main signal to electrical converter card including a main signal port.” Applicant asserts that the combination of Choy et al. and Sekiguchi et al. fails to disclose or suggest such an element of either claim.

As an initial matter, the combination of Choy et al and Sekiguchi et al. fails to disclose or suggest use of electrical to electrical converters. As described in the previous response mailed

August 31, 2007, Sekiguchi et al. does not disclose or suggest an electrical to electrical converter. Choy et al. fails to disclose such a converter as well. Choy et al. discloses use of an IOC card (see, e.g., Choy et al. at Figure 1, item 14). As shown in Figure 2 of Choy et al, the IOC cards are arranged to have a specific electrical connector at one end, and a pair of coaxial cable connectors at an end connecting to the LRC (leading to the optical interface). The Office Action alleges that the transmitter, receiver, and buffers of the IOC card perform electrical to electrical conversion, and are a general purpose interface. (Office Action at 3). However, the IOC cards, including the ECL buffers, merely buffer the same signals as received, and do not perform an electrical to electrical conversion. In addition to the reasons discussed in the previous response, this fact is clearly seen in the fact that the WDMs of Choy et al. supports transmission of data in a number of different formats, such as ESCON, FDDI, CDDI, etc. Choy et al., col. 4:43-59. As disclosed in the portion of Choy et al. cited in the Office Action (and specifically at col. 5:13-30), an IOC supporting, for example a FDDI transmission, will pass that FDDI transmission protocol through the IOC, LRC, and WDM without conversion to another format. It is therefore not through the IOC card that the system of Choy et al. is protocol independent; rather, it is through user selection of differently configured, complementary IOC cards that Choy et al. can be adapted to different protocols. Each card requires a complementary card at an opposite end, because neither card performs an electrical to electrical conversion. Therefore, Choy et al. does not include electrical to electrical converters or main signal to electrical converter cards as required by claims 1 and 14.

Secondly, the Office Action alleges that Choy et al. could be modified to incorporate a card edge connector interconnecting an electrical to electrical card to an optical to electrical card, as taught in Sekiguchi et al. Applicants respectfully disagree, and assert that Choy et al. teaches away from such a configuration. Choy et al. discloses that “an IOC 14 and/or an LRC 20 can be plugged or unplugged from the backplane connector of the WDM 12 without having to first power the WDM 12 off”. col. 7, lines 38-41. Choy et al. specifically teaches removal or replacement or one or both of the IOC and LRC, which could not be accomplished if the two cards were connected at a card edge connector. Rather, it is the independent connection of the IOC and the LRC to the backplane connector in Choy et al. that allow for independent replacement of one of the two cards. Therefore, without acceding to the characterizations of Sekiguchi et al. described in the Office Action, combination of Choy et al. with a second

reference teaching a card edge connector would be improper, because use of such a card edge connector would remove this stated advantage of the system of Choy et al.

For at least the above two reasons, Applicants respectfully assert that the combination of Choy et al. and Sekiguchi et al. cannot render obvious independent claims 1 and 14. Likewise, claim 3 depends from claim 1, and claims 16-19 depend from claim 14. These claims are allowable for at least the same reasons. Applicants therefore respectfully request reconsideration and withdrawal of the rejection of these claims.

B. Claim 2

Claim 2 is dependent from claim 1, and therefore inherits all of the limitations of that claim. Applicants note that the combination of Choy et al. with Sekiguchi et al. and Ramaswami et al. cannot render this claim obvious at least for the same reasons as described in part A, above with respect to claim 1. Ramaswami et al. does not teach electrical to electrical conversion cards as described in the claims, and also cannot be combined with Choy et al. to teach a card edge connector. Because Ramaswami et al. cannot be combined with Choy et al. and Sekiguchi et al. in a manner to disclose the missing elements from claim 1, claim 2 is not rendered obvious by this combination of references. Applicants therefore respectfully request reconsideration and withdrawal of the rejection of this claim as well.

C. Claims 4-6 and 15

Claims 4-6 depend from claim 1, and inherit all of the limitations therefrom. Likewise, claim 15 depends from independent claim 14, and inherits all of the limitations of that claim. Applicants assert that the combination of Choy et al. with Sekiguchi et al., Webb, and Jiang et al. does not render these claims obvious for a variety of reasons.

First, claims 4-6 and claim 15 are not rendered obvious by this combination of references at least for the same reasons as set forth with respect to independent claims 1 and 14, as indicated in part A, above. Without acceding to the correctness of the characterizations of Webb and Jiang et al. in the Office Action, applicants assert that (1) neither reference teaches an electrical to electrical converter or a main signal to electrical converter as required in claims 1 and 14,

respectively, and (2) neither reference can be combined with Choy et al. to teach connection of such a card to an optical to electrical converter card using a card edge connector.

Second, additional reasons exist why the combination of Choy et al, Sekiguchi et al, Webb, and Jiang et al does not render certain of these claims obvious. With respect to claims 4-6, that claim requires conversion to a “common format electrical signal.” Claim 15 requires conversion to a NRZI format signal, which the Office Action references as a common signal. Applicants note that, as previously explained, Choy et al. uses formats that may vary according to each IOC pair. Specifically, Choy et al. indicates that differing IOCs result in differing formats, such as ESCON, FDDI, CDDI, etc. Choy et al., col. 4:43-59. Therefore, in addition to there being no electrical to electrical converter, no common format electrical signal is used. The other references also fail to teach or suggest conversion to a common format electrical signal using an electrical to electrical converter.

For at least the above reasons, Applicants respectfully assert that this combination of references does not render obvious claims 4-6 and 15, and request reconsideration and allowance of these claims.

D. Claims 7-13

Independent claim 7 requires, among other elements, “a plurality of electrical to electrical cards each including a rear interface portion for mating with the electrical interface port and including a power port, a control signal port, and at least one electrical port, each electrical to electrical card including electrical to electrical conversion circuitry for converting between native protocol media signals and common format signals”. Claims 8-13 depend from claim 7, and inherit all of the limitations therefrom. Applicants assert that the combination of Choy et al with Webb and Jiang et al. cannot render these claims obvious at least because this combination of references does not teach or suggest a number of aspects of independent claim 7.

First, Applicants assert that the combination of references does not disclose a plurality of electrical to electrical cards including electrical to electrical conversion circuitry. Although the Office Action alleges that Choy et al. discloses such electrical cards, Applicants disagree with the characterization of that reference in the Office Action. As described in Part A, above, the

IOC cards, which the Office Action asserts are the electrical to electrical cards of the claim, do not in fact perform electrical to electrical conversion among formats. Rather, the IOC cards merely provide a buffering mechanism allowing the data to be passed across the optical portion of the interface in the native format of the data received by the IOC card.

Second, Applicants assert that the combination of references does not disclose converting between native protocol media signals and common format signals in such an electrical to electrical card. As explained in Applicants' response mailed August 31, 2007, the system in Choy et al. does not use a common format signal, and in fact maintains the data in the format received by that system. In response to those arguments, the Examiner now concedes that "Choy et al. does not expressly state that another format electrical signal is a common format electrical signal." Office Action at 16. Applicants assert that Choy et al. is in fact not silent on the format of the electrical signal output from the IOC cards of that reference; the format of output signals from the IOC card is the same as the format of signals received into the card. As explained in column 4 of Choy et al., the data stream type passing through the IOC cards is consistent in its input to and output from the WDM:

Each IOC 14 is associated with one of a plurality of communications channels (1-8) and includes an I/O specific media connector 30 that is coupled to an appropriate transmitter (Tx) 32 and receiver (Rx) 34. The components 30, 32, and 34 are constructed and operated in accordance with the specific data stream type that is input to and output from the associated channel of the WDM 12.

The WDM 12 is capable of supporting a large variety of serial data stream types. Exemplary optical and non-optical data stream types of particular interest include the following:

ESCON/Tahoe (IBM fiber optic host channel), using 1.3 micron LEDs at 200 Mb/s;

ESCON/ECSL (extended distance), using 1.3 micron laser diodes at 200 Mb/s;

FDDI (Fiber Digital Data Interface) at 125 Mb/s;

CDDI (electrical conductor-based variant of FDDI) at 125 Mb/s;

FCS (Fibre Channel Standard);

T1 (1.5 Mb/s) or T3 (45 Mb/s);

Serial or parallel HIPPI (1.25 Gb/s); and

General Purpose (TTL, CMOS, ECL) interface (up to 622 Mb/s).



Choy et al. goes on to explain (column 5) two examples in which a constant format is used throughout any single channel of that system:

By example only, channel 1 in WDM 12a may be bidirectionally coupled to a bit-serial HIPPI channel (via HIPPI-specific media 16a), and channel 1 in WDM 12b is thus also bidirectionally coupled to a bit-serial HIPPI channel (via HIPPI-specific media 16b). Also by example, channel 2 in WDM 12a may be bidirectionally coupled to a bit-serial FDDI optical channel (via FDDI-specific media 16a), and channel 2 in WDM 12b is thus also bidirectionally coupled to a bit-serial FDDI optical channel (via FDDI-specific media 16b). For these two cases it can clearly be seen that the bit rates between channels 1 and 2 differ significantly, as do the underlying data communication protocols and the nature of transmission over the associated networks (electrical signals vs. optical signals). However, the WDMs 12a and 12b enable both bit-serial data streams, in combination with up to six other communication protocols and/or bit rates, to be transmitted and received through the single fiber link 28.

It can therefore be seen that the invention of Choy et al. does not expect a specific signal format to be transmitted through the optical portion of that system; instead, it can expect and transmit any of the types of data for which there are IOCs with compatible connectors. Conversely, the present invention, as claimed, uses an electrical to electrical card to perform an electrical to electrical conversion, converting incoming signals to a common format before converting those electrical signals (now in a common format) to optical transmission.

Furthermore, neither Webb nor Jiang et al. can remedy this shortcoming of Choy et al. Neither reference discloses conversion of electrical signals to a common format in the manner claimed in independent claim 7. Webb generally discloses a “smart” optical coupler that alters the format of electrical signals; it does not disclose conversion to a common format signal for use by a plurality of electrical to electrical cards. The fact that Webb discloses some type of change of signal format change is irrelevant because it cannot disclose a “common” signal format when only a single point contact to an optical system is disclosed. Jiang et al. generally discloses

electrical signal conversion as well; however, it also fails to disclose conversion to a common format signal in an electrical to electrical card. Therefore, none of the references asserted teach or suggest use of or conversion to a common format electrical signal for transmission in an optical system.

Third, and independent of the above reasons, Choy et al. cannot properly be combined with Webb and Jiang et al. to provide a basis for the rejection of these claims. Choy et al. indicates that an important aspect of that invention is “the ability to select a particular IOC 14 for different serial or parallel data protocols and to add, remove, and to change the IOCs at will.” Choy et al. states that this is accomplished by “merely plugging in the same type of IOCs 15a and 14b into the same numbered slots in the two WDMs 12a and 12b at both ends of the fiber link.” Col, 7:24-29. Because Choy et al. teaches use of a consistent single signal format in a channel connecting complementary WDM systems, that system would have no need for the signal conversion or common signal format of claim 7, and these elements would in fact add substantial complexity to the circuitry of Choy et al. Choy et al. therefore teaches away from electrical to electrical conversion and use of a common signal format.

For at least these reasons, Applicants assert that the combination of Choy et al. with Webb and Jiang et al. does not properly render obvious independent claim 7. Because claims 8-12 depend from claim 7 and inherit all of the limitations of that claim, Applicants assert that these claims are not rendered obvious as well. Applicants respectfully request reconsideration and withdrawal of the rejection of each of these claims.

Conclusion

It is respectfully submitted that each of the presently pending claims is in condition for allowance and notification to that effect is requested. Although certain arguments regarding patentability are set forth herein, there may be other arguments and reasons why the claimed invention is patentably distinct. Applicant reserves the right to raise these arguments in the future. The Examiner is invited to contact Applicant's representative at the below-listed telephone number if it is believed that the prosecution of this application may be assisted thereby.

Respectfully submitted,

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